

(19) World Intellectual Property  
Organization  
International Bureau



24 MAR 2005

(43) International Publication Date  
15 April 2004 (15.04.2004)

PCT

(10) International Publication Number  
**WO 2004/031131 A1**

(51) International Patent Classification<sup>7</sup>: **C07C 243/28**

(21) International Application Number:  
PCT/US2003/030869

(22) International Filing Date:  
30 September 2003 (30.09.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/415,672 3 October 2002 (03.10.2002) US

(71) Applicant (*for all designated States except US*): **SK ENERGY AND CHEMICAL INC.** [US/US]; 22-10 Route 208 South, Fair Lawn, NJ 07410 (US).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): **KWON, Taesoo** [/]; 35 Schneider Lane, Montville, NJ (US). **GU, Chen** [/]; 76 Roosevelt Avenue, Lake Hiawatha, NJ (US). **YANG, Soon-Ha** [/]; 1149-1 Bunji, Ilsan 4-dong, Ilsan Gu, Gyeonggi-do 411-828 (KR).

(74) Agent: **SWOPE, R., Hain**; Gibbons, Del Deo, Dolan, Griffinger & Vecchione, One Riverfront Plaza, Newark, NJ-07102 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: **IMPROVED SYNTHETON SYNTHESIS**

(57) Abstract: The present disclosure relates to an improved synthesis of the commercially important synthon ECHB starting from the readily available 3-hydroxy- $\gamma$ -butyrolactone. The reaction employs a single pot procedure without isolation or purification of the intermediates. It has the advantage over procedures previously employed in the art of using reagents and conditions which minimize undesired side reactions and which can be readily employed at commercial scale. The product is produced in high yield and is readily purified to provide an excellent intermediate for further synthesis of commercially important products such as L-carnitine and the pharmaceutically important active substances used in HMG-coA reductase inhibitor products such as Lipitor®.

WO 2004/031131 A1

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/30869

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : C07C 243/28

US CL : 558/445, 451

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 558/445, 451

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
EAST, STN CAS ONLINE

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6,114,566 (HOLLINGSWORTH et al) 05 September 2000 (05.09.2000), entire document	1-17

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

29 February 2004 (29.02.2004)

Date of mailing of the international search report

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Facsimile No. (703)305-3230

Authorized officer

Kamal Saeed, Ph.D., *Kamal Saeed*

Telephone No. (571) 272-0705